The subject is rather intricate, as may be judged from the history of the genera Uruguaya, Carter, 1881, and Potamolepis, Marshall, 1883. In describing the latter, Marshall, it appears, confessed that its separation from Uruguaya depended only on a geographical consideration, one group being found in Africa, the other in South America. Yet now they are assigned to separate subfamilies. Dr. Annandale, however, admits that the recognition of his sub-family Potamolepidinæ "depends to some extent on the fact that no gemmules have been found in any species that can be definitely assigned to the genus Potamolepis," and that if in the future "gemmules be found in an undoubted Potamolepis with specialised gemmule-spicules that can be called microscleres, the genus would have to be transferred to the Spongillinæ." It is evidently a case in dealing with which the student must be specialised as well as the spicules. It will not interest the water board at Cardiff, which is reported to have cleared its pipes of a blockading sponge-growth simplv by using a solution of common salt, without reference to systematic nomenclature.

As it is sometimes supposed that the influence of environment is all-sufficing for the origin of species and makes natural selection a needless hypothesis, it is worth while to quote Dr. Annandale's remark that "it is not unusual for two species that live together to adopt diametrically opposite means to attain the same end." This he illustrates by the case of *Cortispongilla barroisi*, notable for the possession of a well-defined and almost symmetrical central cavity, while *Nudospongilla aster*, which inhabits the same environment, is a peculiarly compact sponge without any trace of a central cavity. The explanation offered is, that "if the particularly well-developed exhalent system implied in the production of a central cavity opening by a large osculum is advantageous in getting rid of silt that has entered the sponge, a compact structure may be equally efficient in preventing the silt from entering at all."

In separate sections of the report several subjects besides sponges are discussed by Dr. Annandale and his collaborators, but to these justice cannot be done within the limits of this notice.

T. R. R. STEBBING.

PROF. P. V. BEVAN.

THE younger generation of Cambridge physicists and many others will have noticed with regret the announcement in last week's NATURE of the death of Prof. P. V. Bevan at the early age of thirty-eight. He had a distinguished scientific record, and his friends confidently expected for him a useful and fruitful career. Entering Cambridge University in 1896 he took up the study of mathematics, and in 1899 was fourth Wrangler. The following year he was placed in the first division of the first class in part ii. of the mathematical tripos. With this equipment he turned his attention to experimental physics, and commenced research in the Cavendish Laboratory under Sir J. J. Thomson. In 1901 he was appointed to a demonstratorship, to which lecturing duties were added in 1904, and in 1908 he became Professor of Physics at the Royal Holloway College, a post which he held till his death.

Prof. Bevan's earliest important research was a very complete investigation of the action of light on the rate of combination of hydrogen and chlorine, but after his removal to London he devoted himself to optics. Starting from the work of Prof. R. W. Wood on anomalous dispersion in sodium vapour, he extended it to the vapours of other alkali metals. He made a detailed study of the absorption spectra of the vapours of lithium and cæsium, mapping their principal lines, and testing the applicability of the various formulæ suggested by Kayser and Runge, Rydberg, and Hicks to the series of lines in these spectra. Both at Cambridge and in London Bevan was keenly interested in the religious life of the students. He was president of the Cambridge Nonconformist Union, and later took an active part in the student Christian movement, to the publications of which he was a contributor. His was a strong, vigorous, and genial personality, which won the affection of all the students with whom he came into personal contact.

A. W.

NOTES.

FOR several days Sir David Gill has been suffering from double pneumonia at his residence in Kensington. As we go to press we learn that though his lungs are improving and he maintains his strength, his condition is still critical.

DR. TEMPEST ANDERSON, whose death was announced in NATURE of September 4, has left 50,000*l*. to the Yorkshire Philosophical Society, of which he was formerly president, and 20,000*l*. to the Percy Sladen Memorial Fund, established by his sister, Mrs. Sladen, in 1904.

IT is proposed to present to the Royal Society a portrait of the retiring president, Sir Archibald Geikie. A small executive committee, with Sir William Ramsay as chairman, has been formed to carry out the preliminary arrangements and collect subscriptions, which it is agreed should range between one and three guineas. Promises amounting to about one hundred guineas have been received already from fifty fellows of the society. Subscriptions may be sent to the treasurers of the Geikie Portrait Fund, at the Royal Society, or paid direct to Messrs. Coutts and Co., 440 Strand, W.C., for the fund. The subscribers will constitute a general committee, and they will be called together at a later date to consider the choice of an artist and other matters.

THE valuable services rendered to public departments by the Royal Society were referred to by Sir Archibald Geikie in his recent presidential address (see NATURE, December 4, p. 405); but it was pointed out that though the society has acquired the character of a kind of central bureau of science, there has been no corresponding increase of financial support. Sir Joseph Larmor, in *The Times* of December 20, refers to two recent matters of national importance in which scientific advice was apparently not invited from the Royal Society or any other expert body. One case is that of the rearrangement of the lightning conductors on St. Paul's Cathedral. During the structural examination made in the past summer the iron bars, inserted at the instance of Benjamin Franklin, the originator of lightning-rods, were found; and it was recalled also that the protection of the cathedral had then (about 1780) been under the consideration of a special committee of the Royal Society. Sir Joseph Larmor asks, therefore, whether in the recent rearrangement the Royal Society, or the Institution of Electrical Engineers, or other expert public body conversant with electrical matters, was approached, or consulted, upon the matter. The other instance mentioned by him relates to the problem of the decaying stone in public buildings. It was recently reported that funds have been obtained from the Treasury, at the instance of the Office of Works, to institute a scientific inquiry on this subject, and it was proposed to move "the Foreign Office to inquire of the Governments of France, Germany, Italy, Greece, and America whether any man of science in those countries had evolved any treatment to combat this very serious evil." Here again it does not appear that the Royal Society, the Chemical Society, or the Society of Chemical Industry have been asked for advice on a national matter especially within their domain, or to provide the information which the Foreign Office proposes to collect from various Governments, though in these days of intimate international cooperation and rapid spread of information in science they could no doubt do so.

AT the meeting of the Society of Antiquaries of Scotland on December 8, Mr. A. Henderson Bishop read a paper on his recent excavations in the Island of Oransay. The excavation of the MacArthur Cave at Oban in 1895 had revealed certain indications which seemed to point to the possibility of there having been a human occupation on or about the line of the 30-ft. beach at a time when the sea had not permanently retired from this level. The evidence, however, was much too meagre and insecure to admit of such a revolutionary theory being founded upon it, but that theory has now for the first time been demonstrated from the shell mounds of Oransay. The line of the beach was found on a contour of approximately 30 ft. round the hill, and the disposition of its constituents was exactly what might have been looked for as the result of powerful seas washing against the talus of food refuse. Very interesting was the attempted reconstruction of the configuration of the site at the time of occupation. What is now a turf-covered sandy hill, some 54 ft. in height, standing about 650 ft. from the present high-water mark, was then an elliptical peninsula washed round nearly the whole of its circumference by the sea and connected by the stone ridge of the beach with the rest of the island. Further, the excavation supplied exhaustive material for a picture of the culture-stage of the inhabitants, and the result is a demonstration of the existence in Scotland of a culture presenting an extremely close affinity to that discovered in the Pyrenees grottos by the late M. Piette, to which he has given the name Azilian. The characteristic implements of both sites are the same—flat harpoons of bone and horn, sometimes with one, sometimes with two, rows of barbs, and generally perforated near the base; shoe-horn-like chisels of deer horn, and bone pins, along with pieces of pumice-stone on which they were fashioned. Very striking was the large number of convex faceted chisels—about 1000 were found—hitherto unexplained, which are regarded as implements worn by gouging the mollusc of the limpet from the shell.

THE death is announced, in his eighty-seventh year, of Mr. J. W. Wilkins, one of the pioneers of the telegraph system in this country.

WE regret to see the announcement of the death on December 18, at seventy-two years of age, of the Rev. Edmund Ledger, professor of astronomy at Gresham College, London, from 1875 to 1908, and the author of several popular works and articles on astronomical subjects.

IT is proposed to place a tablet suitably inscribed to commemorate Benjamin Franklin in the Church of St. Bartholomew the Great, West Smithfield—the parish in which he worked as a printer. Subscriptions for this memorial may be sent to Mr. E. A. Webb, rector's warden, 60 Bartholomew Close, London, E.C.

BY the will of Mr. Arnold Friedlander the sum of 5000*l*. is bequeathed for a Cancer Research Fund, to be applied as his executors may direct towards increasing the knowledge of the cause, characteristics, and effects of cancer and allied diseases, and the best means of the prevention, alleviation, and cure thereof.

PROF. E. L. Trouessart, of Paris, and Prof. W. B. Scott, New Jersey, U.S.A., corresponding members of the Zoological Society of London, have been elected foreign members of the society. Prof. E. Ehlers, Göttingen, Mr. J. H. Fleming, of Toronto, and Dr. C. Gordon Hewitt, Ottawa, have been elected corresponding members of the society.

A LEADING article in *The Northern Whig* of December 19 reminds us that the day of publication was the centenary of the birth of Prof. Thomas Andrews, one of the most notable men whom Belfast can claim. The article gives an interesting and instructive summary of Andrews's career, and of the scientific work which won for him a place among the foremost discoverers of the Victorian era.

THE twelfth general meeting of the Association of Economic Biologists will be held at Liverpool on December 30–31. Among the papers to be presented are:—"Some Observations on the Bionomics of *Glossina morsitans* in Nyasaland," Prof. R. Newstead, F.R.S.; "The First-stage Larva of *Hypoderma bovis*," Prof. G. H. Carpenter; "The Food and Feeding Habits of Some Game Birds," W. E. Collinge; "Pollination in Orchards," F. J. Chittenden.

IN *Man* for December Mr. T. C. Hodson records a curious account of silent bargaining from India. When the person making an offer for a horse at a fair suggests a hundred rupees, he takes one finger of the person to whom the proposal is made under a sheet spread over both their hands, and whispers the work *pakka,* adding another finger for every additional hundred. Similarly, the word *dâna* denotes five rupees, and *sute* a single rupee. It is a gross breach of etiquette to disclose the price fixed while the fair lasts, and it is a question of honour that offers made in this way should be held final and binding.

Mr. J. Reid Moir has reprinted from *The Field Club Journal* a paper on a flint workshop floor recently discovered at Ipswich. In it were found hammer-stones, cores, worked flints, flakes, and "pot-boilers," in great abundance and close association. Comparing these "finds" with specimens of the Aurignac type, now in the British Museum, it is clear that the Ipswich flints belong to the Palæolithic cave period, in the Lower-Middle Aurignacean age. Two important results follow from this discovery. In the first place, it disposes of the theory that all the people of this age were cave-dwellers. Here there is no cave, and the settlement was formed in the open. In the second place, the abundance of "pot-boilers" indicates that these people split their flints in the fire, and, when possible, used the fragments as implements. This is an easy process, as experiments show that when a flint is placed in the fire for about five minutes, cracks appear in different places, and then a sharp blow will shatter the stone into several pieces. Mr. Reid Moir infers from this discovery that there is no hiatus between the industries of the River-Drift and those of Neolithic man, a result of the first importance, if it is found to be verified by further excavation in eastern England.

In a paper on fishes from the Madeira River, Brazil, published in the October issue of the Proceedings of the Philadelphia Academy, Dr. H. W. Fowler describes fifteen species, one of which is made the type of a new genus—as new to science.

An obituary notice, accompanied by a portrait, of Dr. J. W. B. Gunning, late director of the Transvaal Museum, Pretoria, appears in vol. iv., part 2, of the Annals of the Museum. Dr. Gunning, who was born at Hilversum, Holland, on September 3, 1860, went to South Africa in 1884, where he at first practised medicine. Appointed director of the museum in 1898, he raised the Zoological Gardens, which form a part of that institution, to their present high status.

The British Ornithologists' Club has issued a "Guide to Selborne" and "A Synopsis of the Life of Gilbert White," by Major W. H. Mullens, and published by Messrs. Witherby as No. cxc of the club's Bulletin. Both were prepared in anticipation of a visit to Selborne in connection with the twenty-first anniversary of the club; but the visit did not take place, owing to the death of Dr. P. S. Sclater. In the "guide" it is pointed out that on the monument to White in Selborne Church it is stated that his remains are interred in a grave adjacent to the wall to which the monument is affixed. As a matter of fact, it lies outside the north-east corner of the church, the discrepancy being due to the transference of the tablet from the exterior to the interior of the building.

At a particularly opportune moment, when, as has been well said, "a wave of vitalism has passed over society owing to the pervasive eloquence of Bergson and other writers," appears a reprint of an address delivered by the late Prof. Emil du Bois-Reymond on neo-vitalism ("Ueber Neo-Vitalismus," pp. 60; Verlag von W. Breitenbach, Brackwede, price 1 mark), before the Prussian Academy of Sciences, on the occasion of the Leibnitz anniversary in 1894. This is a strong criticism of the vitalistic theories which du Bois-Reymond himself did so much to undermine in Germany, and more particularly of the views of Virchow, Bunge, and of Driesch himself, whose theories have recently found favour in certain circles in this country as a new philosophy, although they are but a recrudescence of those which he formulated in 1893. The strong condemnation by du Bois-Reymond of such views may be summarised in Schleiden's phrase, which is made the text of his address:—"The savage who calls a locomotive a living thing is not more unscientific than the investigator of nature who speaks of vital force in the organism." The new edition is edited, with the addition of useful notes, by Erich Metze.

An account, by Mr. S. W. Kemp, of the Crustacea Stomatopoda (Squillidæ) of the Indo-Pacific region constitutes part i. of vol. iv. of the Memoirs of the Indian Museum. It is really, so far as the structure and relations of the adults are concerned, a monograph of the entire group, since in addition to a review of all the local forms it includes a list, with references and synonymy, of all the species described from other regions. Altogether, according to the author, 139 species and varieties of adult Stomatopoda are known, of which ninety-seven have their being in the Indo-Pacific. All these are critically compared and succinctly described, the author having investigated not merely the extensive collection in his own charge, but also select loan collections from the British Museum and other institutions. No new methods of classification are proposed, though emphasis is laid upon the value of the ischio-meral articulation of the raptorial maxilliped for a primary subdivision of recent Squillidæ; the characters employed in grouping the species are those furnished by the raptorial apparatus, the sculpture of the carapace terga and telson, the form of the abdomen, the size, form, and inclination of the eye, and to a certain extent the presence or absence of a mandibular palp. Masterly as is the "systematic" touch, equal skill and judgment are shown in the treatment of those larger biological problems that always confront the open-eyed systematist, and the style throughout is a model of lucidity. The ten fine plates by S. C. Mondul that illustrate the memoir are part of the Illustrations of the R.I.M. Survey Ship, *Investigator*.

The final part of the "Lepidoptera Indica (Rhopalocera)" has now been published by Messrs. L. Reeve and Co., Ltd., completing the tenth volume of this important work. The task of describing the whole of the butterfly fauna of India was planned and begun by the late Dr. F. Moore in 1890, and since his death in 1907 it has been carried on by Colonel C. Swinhoe, in accordance with the lines originally laid down. The families, genera, and species of the Indian region are all fully dealt with, and more than sixteen hundred species are illustrated by life-sized coloured figures. The Indian region, as recognised by Dr. Moore for the purposes of this work, is bounded by the Himalayas on the north, the Suleiman and Hala mountains on the north-west, and Burma on the east. It includes Ceylon and the Andaman and Nicobar islands. Within these limits is found a butterfly fauna of great and varied interest, less noteworthy indeed than that of Indo- and Austro-Malaya, and far less rich than that of South America, but well deserving of the exhaustive treatment which it receives in the present work.

MR. IMMANUEL FRIEDLÄNDER, of Villa Hertha, Vomero, Naples, has published, with Dietrich Reimer, Berlin, a small quarto work of 110 pages, with nineteen plates and eleven maps, entitled "Beiträge zur Kenntnis der Kapverdischen Inseln." This gives the results of a journey made by him in the summer of 1912. After briefly summarising the literature and the maps of the Cape Verde Islands, giving some details of their history, of the climate, inhabitants, health relations, fauna, and vegetation, the author gives an account of his geological observations on the various islands. A valuable synopsis of the rocks collected on the islands by Stübel, Bergt, and Friedländer is contributed by Prof. W. Bergt, of Leipzig. The work should be particularly useful to anyone proposing to visit these islands, which, obviously, are worthy of further study. Mr. Friedländer has long been attempting to establish in Naples a Vulcanological Institute under international auspices, but since his plans have not met with all the support he hoped, he has determined to begin at once with a small private institute established by himself, but open to students of all nationalities. It is hoped to lend out instruments from the institute, and to publish as its organ a *Vulcanologische Zeitschrift*.

THE July number of the Journal of the College of Agriculture, Tokyo, contains an interesting paper by Osawa on the sterility in *Daphne odora*, Thunb. This species is a native of China, commonly cultivated in Japan, where it is completely sterile. The pollen and embryo sac development in two related wild Japanese species, *D. pseudo-mesereum* and *D. kiusiana*, were studied for comparison. The latter are fertile, even under cultivation, in Japan. In the microspore mother-cells of *D. odora* extra nuclei are frequently formed, and various other irregularities occur. Even mature pollen grains which reach the stigma fail to germinate. Megaspores are also formed, but the embryo sacs usually degenerate before completing their development. This species is thus sterile in both sexes. In the two fertile species the sporophyte number of chromosomes is eighteen, while in *D. odora* it is about twenty-eight. Osawa refers to the conclusion of Darwin that sterility may result from change of climate or from the effects of cultivation, as well as from crossing, and he also cites a number of sterile plants which are known or believed to have originated through mutation, as in the well-known case of *Œnothera lata*. The author concludes that the sterility of *D. odora* has been caused either by cultivation or by mutation. The change in chromosome number in this species, together with the absence of sterility in the other two species in cultivation, favours the latter hypothesis, which could be verified by determining whether *D. odora* is sterile in its original habitat.

THE monthly parts of *The Geophysical Journal* issued by the Meteorological Office for 1912 contain daily meteorological, magnetic, electrical, solar and seismic data for Kew and Eskdalemuir, meteorological and magnetic data for Valencia, and values of the wind components for certain hours for four stations. They also include the results of the investigations of the upper air, and other useful data. The units are based on the C.G.S. system; the reasons for adopting the centibar or millibar instead of the inch for barometric measurements are given in the preface to the 1913 edition of "The Observer's Handbook" published by the office. As all attempts at popularising these units will be welcome to most meteorolgists, we may take this opportunity of referring to a useful article by Mr. Bonacina in the September number of *Symons's Meteorological Magazine*, relating to the valuable work by Prof. Bjerknes on dynamic meteorology and hydrography (Publication No. 88 of the Carnegie Institution of Washington). Among Mr. Bonacina's interesting remarks it is pointed out that barometric readings in inches "no longer avail when meteorological data are employed *quantitatively, i.e.* to serve for the pre-calculation of ensuing atmospheric changes, in accordance with the avowed aim of the new method."

THE director of the Meteorological Service, Survey Department, Egypt (Mr. J. I. Craig), has recently published his report on the rains of the Nile Basin and the Nile flood of 1911, in the usual form, with tables and plates. For the whole year there was a general deficiency of rain, except in Kordofan, and on the White Nile. In a chapter dealing with the normal rainfall it is stated that the time of its distribution is more complex than has been supposed; the regional curves show that they include three separate distributions, instead of two, as usually supposed, and an attempt is made to give a simple explanation of the facts. As a whole, the flood of 1911 started early, but afterwards was late and poor; it improved in September, and "matters were not so bad as at one time they promised to be." The report includes some interesting notes on the regimen of Lake Victoria; the mean annual variation of its levels at various seasons is said to be only 28 centimetres (11 in.), but the surface rises and falls by much greater amounts, consequent on variations in the intensity of rain and evaporation from one year to another.

AN interesting notice of the late Prof. Milne appears in the last number (vol. xvii., part 3–4) of the *Bollettino* of the Italian Seismological Society. Dr. Martinelli refers to his ability as an organiser, to his two text-books on "Earthquakes" and "Seismology," to the seismographs with which his name is connected, and to the fact that he was a pioneer in almost every department of his science. The only noticeable omission is that of all reference to his useful work on the construction of buildings in earthquake countries.

In a circular just issued by the Bureau of Standards of Washington giving the fees charged for tests of apparatus intended for temperature and heat measurements, a considerable number of hints as to the best methods of use of such apparatus are given. These hints cover thermo-electric pyrometers, both with elements of platinum, platinum-rhodium, and of iron, nickel, chromium, and their alloys, platinum resistance thermometers, and radiation pyrometers of both the single colour type, and those using the whole radiation. The provisional temperature scale now in use at the bureau is indicated by the following melting points:—Tin, 232°; cadmium, 321°; lead, 327°; zinc, 419°; antimony, 630°; aluminium, 658°; a silver-copper alloy of composition Ag_3Cu_2, 779°; silver, 961°; gold, 1063°; copper, 1083°; nickel, 1450°; palladium, 1550°; platinum, 1755°; alumina, 2050°; tungsten, 3000° C.; and the following boiling points at atmospheric pressure:—Naphthaline, 217·9°, benzophenone, 305·9°; sulphur, 444·6° C.

When light is transmitted through a liquid in which a fine precipitate has just been formed, it is well known that the absorption due to the liquid increases with the time, while the proportion of polarised light in the scattered light at right angles to the incident beam decreases, both changes being due to the increase in size of the precipitated particles. A similar relation has long been suspected between the absorption of the atmosphere for the sun's rays and the degree of polarisation of the light of the sky. The question has been tested experimentally by M. A. Boutaric, of the University of Montpellier, and his results appear in Bulletin No. 7 of the Classe des Sciences of the Belgian Royal Academy for 1913. The intensity of solar radiation was measured by an Angström pyrheliometer, and the proportion of polarised light in the light of the sky by a Cornu photopolarimeter. The measurements show conclusively that for the greater part of the radiation received from the sun the absorption due to the atmosphere is closely connected with the proportion of polarised light in the general light from the sky. When one of the two increases the other decreases. Selective absorption plays a relatively unimportant part except in certain well-marked regions of the spectrum.

In the Records of the Geological Survey of India (vol. xliii., part 1, 1913) Dr. L. L. Fermor contributes a preliminary note on garnet as a geological barometer, and on an infra-plutonic zone in the earth's crust. Observations on the Kodurite series of rocks in the Vizagapatam district led him to inquire why these garnetiferous rocks had been caused to crystallise as such rather than according to the norm, or standard, mineral composition of Cross and Iddings. He concludes that since the garnet rocks have a higher specific gravity than their norm calculated from the chemical analyses, they must have crystallised under greater pressure. "Therefore it seems legitimate to postulate the existence below the plutonic rocks (which are typically non-garnetiferous) of a shell characterised by garnets wherever a sesquioxide radicle exists." For this shell he suggests the term *infra-plutonic*. He considers that carbon existing as graphite in the higher zones of the earth's crust will probably be represented by diamond in the infra-plutonic zone on account of the high density of the latter mineral. It is thus deduced that garnet and diamond will be two of the characteristic minerals of the zone. A release of pressure over any portion of the infra-plutonic shell would allow the liquefaction of that part of the shell under the high temperature prevalent; such liquid rock, on being intruded into the higher zones of the crust, would then solidify under lower pressure as a plutonic rock.

In "A Theory of Time and Space" (Cambridge: Heffer and Sons, 1913, pp. 16) Dr. Alfred A. Robb gives a brief account of his investigation of the relations of time and space in connection with optics, which he hopes to publish before long in book form. His problem consists in reconstructing from the bottom the theory of relativity which, though much discussed, is "still in a condition of considerable obscurity." The chief part in Dr. Robb's mainly logical investigation is played by the idea of what he calls *conical order*. This means that there are pairs of instants, A, B, such that, though A is neither before nor after B, the instants A, B are not identical. According to the author's view, the only events which are "really simultaneous" are those which occur at the same place. Of events occurring at different places one is, generally speaking, neither before nor after the other. Only if it be abstractly possible for a person, at the instant A, to produce an effect at the instant B, is the instant B said to be after A. This is one of the fundamental definitions given along with a set of postulates. By means of these and certain additional postulates, Dr. Robb promises to develop a system of geometry based on the conceptions of "after" and "before," and thus to include the theory of space in the theory of time. If A is an instant of which I am directly conscious and B is distinct from, but neither before nor after A, then B, of which I can be aware only indirectly, assumes an external character. In short, it is an instant "elsewhere." All who are interested in the subject will desire to see these remarkable and radical ideas developed fully in the promised book.

Quick and at the same time trustworthy methods of quantitative analysis are amongst the most important desiderata of biological chemistry, and any additions to their number are to be welcomed. Dr. P. A. Kober's application of the nephelometer, an instrument first introduced into analytical chemistry by Richards, to the study of enzyme chemistry is a case in point. In recent papers from the Harriman Research Laboratory, New York, he describes the conversion of the Duboscq colorimeter into a nephelometer, which he uses to determine the amount of dissolved protein present in a solution by precipitating it as a suspensoid by a suitable reagent. Comparison with a standard containing a known amount of the precipitated protein enables the accurate estimation of very small amounts of protein. Having found suitable precipitants for various proteins—for example, sodium chloride for edestin, sulphosalicylic acid for casein—he is able to measure the amount of peptic, tryptic, and ereptic digestion with accuracy and speed. In a second paper (Journal Amer. Chem. Soc., 1913, vol. xxxv., 1546) the same author describes improvements in the micro-chemical method of forming copper complexes of amino-acids, peptides, and peptones in neutral or slightly alkaline solution, so that quantitative results can be obtained in dilutions of one part in 500,000. It is shown that very few other substances react with the reagent, and these can be easily removed by means of ammoniacal lead acetate. The method has been studied carefully in its application to blood, urine, and the measurement of proteolysis, and it appears to give results accurately and quickly with small amounts of material. Seeing that the Sörensen, van Slyke, and Abderhalden methods for determining amino-acids have each in their turn been most fruitful in advancing the knowledge of the proteins much is to be hoped from the application of the new method.

MR. FRANCIS EDWARDS, bookseller, 83 High Street, Marylebone, W., has issued a catalogue of books, pamphlets, engravings, maps, and manuscripts relating to the whole American continent. The catalogue contains some 1662 entries, many of them referring to works of unique interest.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES FOR JANUARY, 1914:—

Jan. 3. 9h. 0m. Earth nearest the Sun.
5. 6h. 0m. Mars at opposition to the Sun.
8. 21h. 41m. Saturn in conjunction with the Moon (Saturn 6° 47′ S.).
11. 1h. 49m. Mars in conjunction with the Moon (Mars 0° 34′ S.).
12. 1h. 39m. Neptune in conjunction with the Moon (Neptune 4° 26′ S.).
17. 7h. 0m. Neptune at opposition to the Sun
20. 4h. 0m. Jupiter in conjunction with the Sun.
24. 21h. 0m. Mercury in superior conjunction with the Sun.
25. 6h. 32m. Venus in conjunction with Jupiter (Venus 0° 33′ S.).
,, 8h. 43m. Jupiter in conjunction with the Moon (Jupiter 3° 22′ N.).
,, 8h. 54m. Venus in conjunction with the Moon (Venus 2° 48′ N.).
27. 20h. 0m Uranus in conjunction with the Sun.
30. 15h. 36m. Venus in conjunction with Uranus (Venus 0° 30′ S.).

A FAINT NEW COMET.—A Kiel telegram dated December 18 reports the discovery by Delavan of a comet of magnitude 11·0 on December 17 at 10h. 34·8m. La Plata mean time. Its position is given as R.A. 3h. 3m. 19·2s., declination 7° 25′ 24″ south.

A further telegram from Kiel, dated December 19, reports the observation of this comet at Bergedorf on December 18, at 8h. 5·3m. Bergedorf mean time. It is stated to be of magnitude 11·0, and its position is given as R.A. 3h. 2m. 41s., and declination 7° 21′ 29″ south.

THE EARTH'S ALBEDO.—*Astronomische Nachrichten*, No. 4696, is occupied for the main part with a contribution by Mr. Frank W. Very on the earth's albedo. The research consists of determining the albedo from visual observations on the earth shine on the moon in comparison with light from similar sun-illuminated areas on the moon's surface. The contribution describes in the first instance the photometer employed, the methods of procedure, and the necessary constants of the instrument. Then follow the records of the observations made during the years 1911 and 1912. Mr. Very finally concludes that in round numbers the earth shine at new moon has an intrinsic brightness of about 1/1600 of moonlight of average quality, such as is received shortly before first quarter. He eventually states, as a final result, that the albedo of the earth may be taken as Ae=0·89. This value he finds favours the higher of the two values of the solar constant, namely 3·6 cal./sq. cm. min., which he published at the beginning of this year.

ANNUAIRE DE L'OBSERVATOIRE ROYAL DE BELGIQUE.—The Royal Belgium Observatory's Annual, published under the direction of M. G. Lécointe, the director of the observatory, is well known to amateur and professional astronomers on this side of the channel, and the issue for the year 1914 will be found as useful as ever. The aim of the publication is to present the indispensable elements to those who interest themselves in astronomical observations and to help render the science more popular by means of numerous clearly written articles on various astronomical topics. The list of the contents is a very full one, but attention can only be directed to one or two of the items inserted. The recent progress of astronomy, *i.e.* the progress up to the end of the year 1911, is well summarised by M. P. Stroobant, and is very well illustrated. Under "Periodic Comets" an interesting table is given showing, among other facts, the epochs of the first and next appearances. The scheme for the distribution of international time by wireless is thoroughly described, and such sections as those devoted to different tables, their cost, elementary notions on the measurement of time, &c., will be found useful.

DISTRIBUTION OF ELEMENTS IN THE SOLAR ATMOSPHERE.—In this column for September 11 very brief reference was made to an important paper by Mr. Charles E. St. John on radial motion in sun-spots, the contribution in question dealing with the distribution of *velocities* in the solar vortex. The November number of *The Astrophysical Journal* (vol. xxxviii., No. 4, p. 341) is devoted to a second portion of the investigation, and deals with the distribution of the *elements* in the solar atmosphere. This paper forms No. 74 of the contributions from the Mount Wilson Solar Observatory. Mr. St. John finds that radial displacements are intimately associated with depth, and, assuming as a standard a series of displacements shown by the iron lines, he deduces the relative level of twenty-six other elements of the reversing layer and chromosphere. The distribution shows that the form of calcium that produces the H and K lines is at the highest level, followed by the Hα line of hydrogen. Then successively come the vapours of magnesium, sodium, iron, aluminium, &c., each increasing in absolute density with the depth until in the lowest portion of the reversing layer occur also the vapour of all the elements the lines of which appear in the solar spectrum. It is interesting to note that enhanced lines show smaller radial displacements than unenhanced lines of the same solar intensities, and thus originate at higher levels in and near sunspots. A differentiation is also made between the levels of different groups of iron lines. A comparison of the radial displacements with the weakening and strengthening of spot lines shows that the latter is associated with increase of depth and the former with high elevations. Numerous other important conclusions are included in this investigation.